

Lec 1

Simulation and modeling

Model: is abstraction of the reality to study performance.

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Why do we use modeling?

- Understand
- Study
- analysis
- Communicate

Simulation: run the model to study the performance

Search for modes of thinking

Search for UML diagrams

Modeling Types

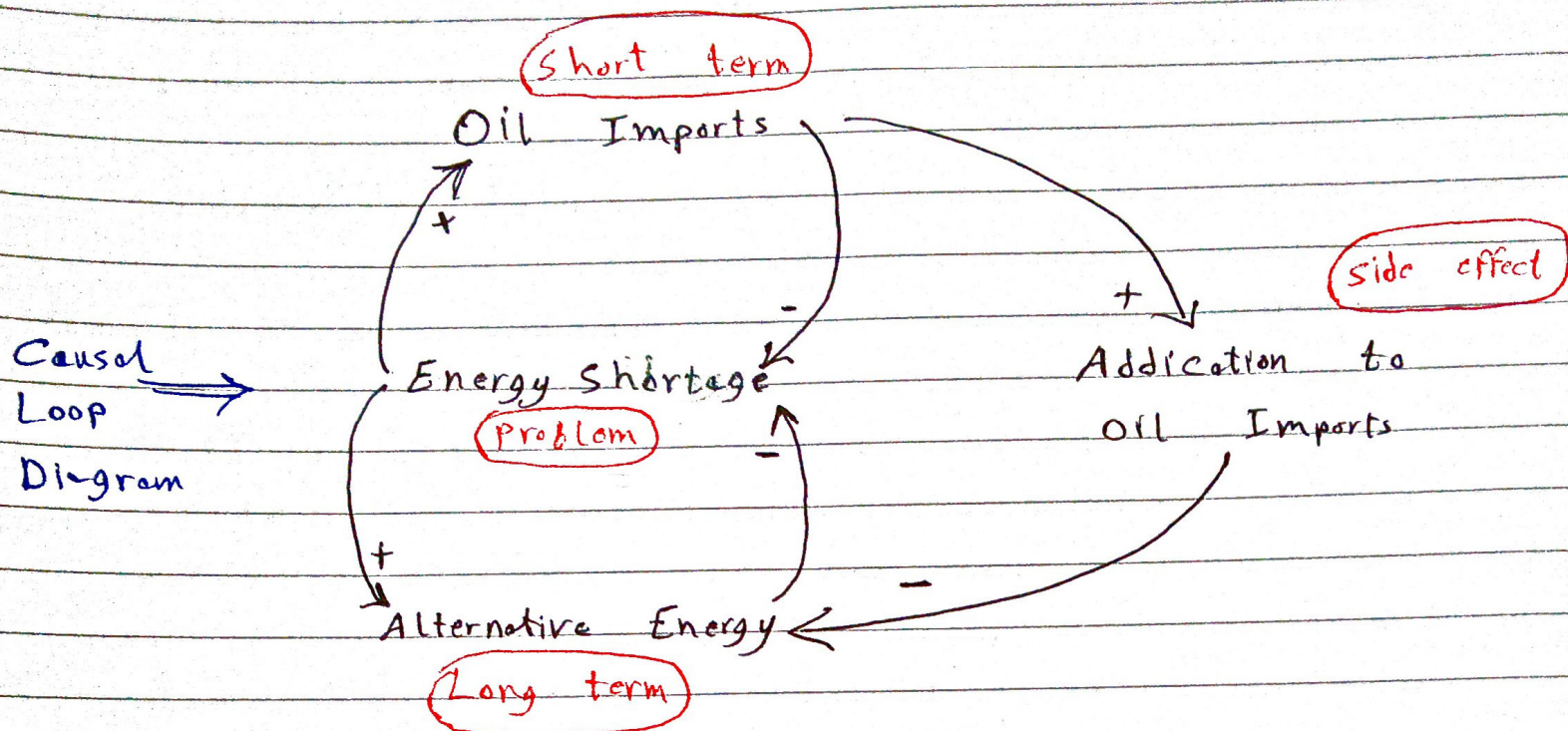
- Discrete model EX: $X(k+1) = X(k) + 5$
- Continuous model EX: differential equations
- physical model EX: Car prototype
- Stochastic model

There is not random variable in reality but some variables look random because we don't have the knowledge to create model for this variable.

Any problem has two solution

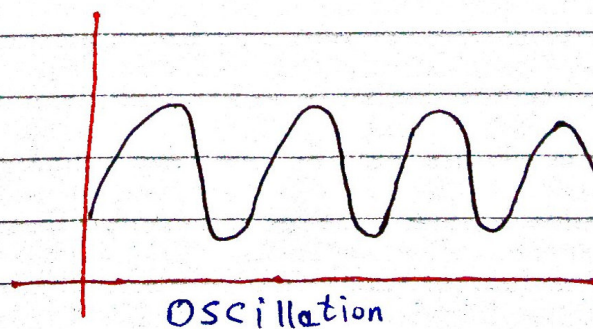
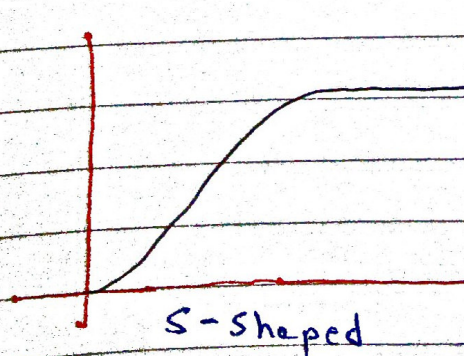
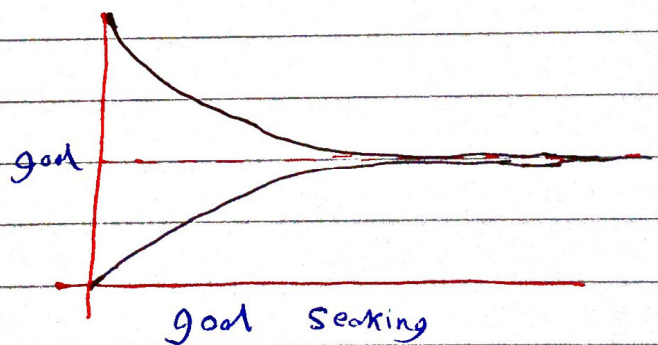
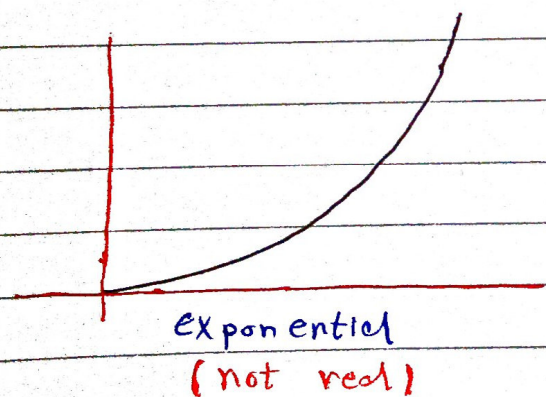
- Long solution \rightarrow Fundamental solution ~~Alternative~~
- short solution \rightarrow quick solution

Ex Oil and Energy problem



Limit of growth

* pattern of behaviours :



System consist of three Levels :

- event ~~is~~
- behaviour → hidden
- Structure

Big Changes could be done By changing system structure

Search for System Dynamics group

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